



## Factsheets - Corn

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### **CORN LETHAL NECROSIS**

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First described in 1976, corn lethal necrosis (CLN) is found primarily in north central Kansas and south central Nebraska. Kansas counties with a history of (CLN) include Norton, Phillips, Smith, Republic, Cloud, Osborne, and Decatur Counties. Only one new county, Decatur County in 1989, has been reported as having (CLN) since the original outbreaks in 1976 and 1977. In recent years, (CLN) has been found mostly in Norton and Phillips Counties in the Prairie Dog Creek watershed. Movement of (CLN) in Nebraska has occurred at a very slow pace, moving north and west into the Platte River valley.

Corn lethal necrosis develops when two viruses occur together in the same plant. One virus is maize chlorotic mottle virus (MCMV) which, until its appearance in Kansas, was only known to occur in South America. This virus ordinarily produces mild symptoms when present alone in corn; however, when a key second virus also infects the same corn plant, a synergistic reaction rapidly develops, resulting in serious damage to the plants. Both maize dwarf mosaic virus-strain B (MDMV -- also known as sugar cane mosaic virus) and wheat streak mosaic virus (WSMV), two common Kansas viruses, can serve as the important second virus; however, the (MCMV) + WSMV combination occurs infrequently in the field. The reduction in yield damage is far in excess of that predicted from the cumulative effects of the individual viruses.

### **SYMPTOMS**

Symptoms of single infections with either MDMV or (MCMV) include light greenish mottling (alternating light and dark green areas) of the leaves. Often there is little obvious damage occurring, and the symptoms may become masked or disappear. When both viruses are found in the same plant, however, a bright greenish-yellow mottling develops in the leaves. In contrast to the single infections where the plants may outgrow the mosaic symptoms, the bright greenish-yellow mottling of (CLN) persists to the end of the growing season. Toward the end of the season, leaves may die inward from the margins with eventual death of mature plants, usually from the top down. Ears may be small, often distorted, and have limited or no kernel development. Infected plants are frequently barren, especially if infection is early.

Corn plants are susceptible at all stages of development, from seedling stage to near maturity. The bright greenish-yellow symptoms usually are not seen, however, before late June or early July. Symptoms will only occur on leaves that emerge after infection takes place. A plant infected later in the season may have a poorly filled ear with premature drying of the husks but no leaf mosaic symptoms.

### **VECTORS**

As with many viruses, a vector (carrier) is required for spreading the virus from plant to plant and field to field. Greenhouse research has suggested that maize chlorotic mottle

virus may be vectored by corn rootworm beetles; however, this has not been demonstrated in the field. An outbreak of (MCMV) in a Hawaiian breeding nursery has been linked to thrips. There is also an undetermined soil-borne mechanism for the overwintering of (MCMV) in infested fields. Maize dwarf mosaic virus-strain B is vectored by greenbugs and corn leaf aphids. Wheat streak mosaic virus is carried by the wheat curl mite.

## **DISEASE MANAGEMENT**

The last serious epidemic of (CLN) occurred in 1988. The reduction in disease severity in recent years can probably be attributed to the lack of migration and development of greenbugs. Since greenbugs are the primary vectors of MDMV, which has to be reintroduced each year, (CLN) did not develop. The incidence of (MCMV) remains steady, however. Results of a survey conducted in 1993 showed 20% of the fields sampled in north central Kansas continue to be infected with (MCMV).

Research conducted in Nebraska continues to show that crop rotation greatly reduces the incidence of (MCMV) in first year corn even in susceptible hybrids. A susceptible hybrid can probably be safely planted in a field the first year following rotation. The second year, however, the field should be planted to a tolerant hybrid. Rotate the field out of corn the third year.

No resistant hybrids have been developed to date; however, several display good levels of tolerance. In inoculated trials conducted in Nebraska, losses in hybrids have ranged from one to 80 percent.

Growers should not become complacent about (CLN) just because they have not experienced serious disease problems recently. Maize chlorotic mottle virus by itself can cause significant yield losses even in tolerant hybrids. Often, these losses may be going unnoticed since the symptoms of infection with (MCMV) alone are usually not very dramatic compared to the symptoms associated with (CLN) and may even disappear as the growing season progresses.

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### ***Selected References***

*Doupnik, B.L., Jr. 1994. Corn Lethal Necrosis Tests. 1994 Corn Hybrid Reactions and Disease Update. UNL/SCREC 94/5.*

*Corn Lethal Necrosis, pp. 68-69 in Compendium of Corn Diseases, Second Edition, M.C. Shurtleff, Ed. APS Press, St. Paul, MN.*

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